HINTS
TOWARD A NATIONAL CULTURE
FOR YOUNG AMERICANS

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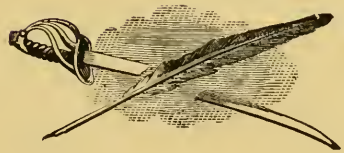
BY
S. S. BOYCE.

The culture which licks the world to shape.
GOETHE.



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Contents.

Our whole working power depends on knowing the laws of the world — in other words, the properties of the things we have to work with, and to work among, and to work upon.

JOHN STUART MILL.

The more we know of the nature of that on which, and by which, and in which, and for which we work, the more likely, nay certain is our work to turn to good account.

Dr. HODGSON.

PREFACE.

The writer does not wish to claim for this little volume anything more than is indicated by its title — *Hints toward a National Culture*, — and he is painfully aware that it comes far short of completeness even in this respect. The writer does not, however, wish to apologize for its publication, he thinks it necessary. It is the result of a careful study of the industrial wants and condition of the country, a recognition of the growing demand for a more complete practical system of Industrial Education as the co-efficient of a more rapid industrial progress.

The overshadowing interest of the people of the United States, at this time, is the building up of a great intelligent Industrial Nation, and the writer believes that the establishment of a complete harmonious union of the Educational and Industrial interests of the country is not only practicable, but the eminently important subject of present consideration.

There is a growing feeling that the present public-school system not only fails but is incapable of affording that preparation for usefulness which is demanded, and which the people have a right to expect in the present enlightened condition of the world.

This conviction is taking shape in the establishment of Agricultural and Mechanical Colleges in the different states; in the endowment of Cornell University; in the founding of the Mechanics' Institute at San Francisco; in the Stevens Institute of Technology, and in the partial scientific courses of other Colleges: in all of which the object is to furnish a practical knowledge of Industrial pursuits.

In the results attending the workings of these creditable institutions there is the greatest encouragement to further efforts. It is not, however, only those able to pursue this higher course of study who need the advantage of practical teaching, while even in these higher institutions the close observer will detect a want of readiness and confidence arising from the absence of an early training, and suggesting the necessity of a corresponding system of teaching the rudiments preparatory to this higher course of study, both as giving greater facility and saving the time of the child's most susceptible years.

The foundation of any practical knowledge is most effectively laid in childhood, as the results of such training are more marked and effective. The writer believes, therefore, that the present want is a school system which will afford an early preparation for usefulness, as well as for intelligently entering upon the higher courses of study.

Some practical efforts are also making in this direction in the establishment of School Shops and Schools of Design in the larger cities, and in the introduction of drawing in many of the leading schools. But this progress is felt to be too slow. It is not aimed at the foundation upon which the structure of a successful system of practical education must be laid. Nothing short of such an entire revolution in the educational process as has been wrought in the world of Science during the past half century can serve the purpose. New schools in a few isolated instances are not enough. It must be a complete re-organization of the great grand national system of free schools as the foundation of this culture, and the writer would if possible arouse a further interest in the subject, by an effort to shape, consolidate, and to some extent give direction to the present discussion.

But beyond these considerations the writer's present wish is to encourage young men engaging in industrial pursuits by giving them a greater confidence in the dignity of their calling, inciting them to a higher aim, and animating them to that renewed activity which a just comprehension of the relatively high position and great importance of these pursuits should inspire.

If these hints shall meet with even partial results in awakening further consideration in this connection, the writer will have accomplished all he anticipates.

NEW YORK, May, 1879. S. S. BOYCE.

HINTS TOWARD A NATIONAL CULTURE.

CHAPTER I.

Introductory.

The first principles of education recognize the fact that human nature and human skill are improvable by cultivation. That the children of America are awaiting this training to enable them to enter the pursuits in which they are to be usefully and successfully employed, suggests the direction which that educational training should take.

The greatest necessity of humanity is profitable employment, the next requirement is that certain work should be performed. The problem then is to prepare the laborers, the most practically, for the work, and to introduce them in the most direct manner to their future field of labor.

There is no disguising the fact that the times are out of joint; that the relation of man to his pursuit is interrupted by some evil which imperatively calls for a remedy, while the conviction is becoming more and more wide-spread that the evil is very largely attributable to the absence of a practical system of direct educational training in keeping with the new industrial condition of the country.

The world offers man the greatest variety of employment; presents him the material he is to work with and upon, while his needs suggest the direction of that labor; and yet the country makes no intelligent effort to inform the youth of the nature of that employment or prepare them to intelligently engage therein. The character of the raw material and the production required from it are endlessly varied, and the same varied skill and intelligence is demanded, and yet the public-school system, endowed by the states and

the nation, for the education of the common people, makes no reference to nature's stores of crude but rich material; no reference to their value or their use to man and no reference to the skill required to shape and adapt them.

The arts growing out of the necessity of producing and shaping those materials are the proper and abundant employments of man; while discipline and intellectual development come as readily from the study of these natural objects. It is also plain that any high degree of culture can only come to the great numbers of mankind in connection with their industrial prosperity.

Experience in industrial operations during the past quarter of a century has taught the lesson that to be successful the highest intelligence and the highest skill are necessary. These can only be obtained by a direct study of, and practice with, the proposed material and pursuit. That the best time for obtaining the rudiments of that practical knowledge is in youth, that the faculties are then the most easily awakened and impressed, and a correct estimate of value and importance is then most easily acquired. But, the knowledge and training now obtained at the higher institutions of learning, much more at the common schools, in no wise prepares the youth to enter into practical business pursuits.

On the contrary, after spending his most susceptible, most valuable years in obtaining that liberal education, he is obliged to almost wholly discard the knowledge he has obtained, forget or laboriously unlearn it, and enter anew and at the beginning into an entirely new drift of mental discipline and practical industrial training. He must, when old, acquire rudiments so simple that the merest child may comprehend them, and that with the uncertainty that he will ever master the new knowledge in a manner to attain to more than the most ordinary proficiency in any industrial pursuit. This calls for such a reformation or complete revolution in the public-school system as will

remedy this glaring evil and at once ensure to the child the rudiments of useful practical knowledge, and that during the few years he has to give an attendance at school.

The revolution in the industrial world wrought during the past half century by steam, electricity, and machinery, and the necessity of conforming educational training thereto, have awakened the public mind to the necessity of an equal revolution in the system of primary schools; at least so far as to engraft upon the present public-school system such rudiments of industrial teaching as will, so far as possible, fit the youth of the nation to at once enter into the prosecution of the varied employments already so numerously established and springing up all over the country.

The proper aim of educational training is to prepare the child for usefulness, for the efficient and successful pursuit of his chosen employment; and the conspicuous absence of any reference to the study of natural history, physics, mechanics or industrial creation, is only accounted for by the fact that when the present public-school system was established, these subjects were considered of but little importance. They had but little influence upon man's condition, and any needed modification of a school system chiefly in the interest of the uneducated classes is slow in impressing its importance upon the public mind.

Some efforts to enlarge the sphere and improve the system of educational training in the interest of industrial pursuits, have been made in some parts of Europe, and as applied to special results have been successful. There are also a few instances of similar beginnings for special purposes in America, but chiefly devoted to the teaching of the children of affluence, and those of older years, and after the rudiments of their education, either good or bad, have been planted, rather than commencing with childhood. Such examples are found in the partial courses of instruction in the technical colleges, and as required by the naval academies and military schools under direction of the Government,

looking to the practical preparation, each year, of a certain number of youth for the special callings in the fields of action where their labors are to be required. In the latter the Government recognizes the necessity of keeping pace with the revolution in military science and steadily conforms its systems of teaching thereto.

The American public-school system is at present little more than a relic of a less enlightened age, handed down with little attempt to enlarge its scope or improve its character. This system was instituted when there was but little for the common people to learn, when law, theology, and medicine were the only pursuits of sufficient importance to need a direct or exact training, and the system was chiefly based upon the needs of these callings; and the faith of the fathers has so long been centered in the overshadowing importance of this peculiar system that the great strides in the scientific world have as yet been without their due consideration. But the world has been busy during the past half century in a complete revolution of the material world. It has been creating new industries, discovering new principles and powers in nature, new fields of labor; in searching out new facts of science and preparing the people, did they but take advantage of it, to have less need of law and medicine, and more of the needs of every-day life, and more of health, industry, and self-government.

When the present public-school system had its origin, there was little science of agriculture to be taught; few laws of hygiene to be observed; no worlds beyond the seas with which to hold daily converse; no commerce worth the time of considering it; few products to exchange; no industrial rivalry of nation with nation; the mines of the world were in repose; the raw products neglected; the manufactures of the world not yet given birth; no governments by the people, and while almost society "was without form and void."

All the subjects of interest to mankind at that time might have been counted upon the fingers, and were rather the operations and employments of those in affluent circumstances, than the pursuits or necessities of common people. The little teaching of reading, writing, and accounting was all that the affairs of the common people required; metaphysics was then the important physics; the polite rather than the useful arts were the subjects of interest, and the system of education then obtaining has since rather been left to care for itself, as if hoping that in the presence of a universal intelligence, of the printing-press and the newspapers, it would maintain the position and progress desired, rather than by any direct intelligent effort to conform it to the continually advancing growth of practical knowledge.

This teaching of youth has continued to be left in that old and time-worn groove, or under the ban of a partisan sectarianism, which has rather sought to ward off any impressions or influence of science upon any modification of that system, or upon the guidance of the development of the youthful mind.

Educational training has hardly yet become divorced from its unnatural association with the strifes and superstitions of religious controversy; has hardly yet been recognized as the custodian charged with the stupendous problem of the future progress of the material world.

This old school system may have had its important influence in aiding to early reclaim the world from barbarism and in developing the latent germs of civilization, but when the lightnings became man's playthings, steam his servant, and machinery his workmen, there was less need of serfs, of slaves, or of *common* people; and the time has come when all of human birth may aspire to the highest positions, and when only education is required to make all mankind free and equal.

The literature and general intelligence of the country is wide, all that free speech and free institutions can ask for,

but exact knowledge is still limited; the system of education is still narrow and lamentably deficient in its scope; confined in its purpose; and often worse than fruitless in its result.

With the dawn of the age of science, research and invention, has also come the necessity of a complete revolution in the system of educational training. The world's interests are now in the industrial pursuits, and these are the employments of the people. Education is now the lever needed to raise the people to a condition of industrial prosperity and intelligence. Any public-school system which does not make the interests in which the youth are to be employed immediately upon leaving school, its chief element, is simply a contradiction, a deception. It is not easy to imagine a more complete, utter waste of time on the part of those who have their fortunes to make than that now spent by the youth of America at the common schools.

Not merely and only that the child leaves school uneducated, but he is falsely educated; his mind is filled with a worse than trash, taught to give the greatest importance to utterly valueless things. His treasury is filled with tinsel, and not with gold; the world will not honor his draft upon its possessions; his intellectual stomach is overburdened with what can never be digested; his intellect biased, prejudiced by the presence of impracticable knowledge, all of which is in the way of his success.

Nothwithstanding our rapidly extending requirements, the old effete system is still the educational training given our children, and with which we still compel them to lay the foundations of their future prosperity — committing upon them the crimes of deception, for we have learned better; counterfeiting the genuine, for we have proved its baseness, and palming off a forgery upon posterity, contradicting our highest, hardest-earned knowledge, wasting human lives, blasting human prospects, hazarding a nation's welfare, and putting off her prosperity.

Prof. Huxley, in an address to English workingmen, thus characterizes the evils of the system of primary schools in that country:

"Least of all, does the child gather from this primary 'education' of ours a conception of the laws of the physical world, or of the relations of cause and effect therein. And this is the more to be lamented as the poor are especially exposed to physical evils, and are more interested in removing them than any other class of the community. If any one is concerned in knowing the ordinary laws of mechanics, we would think it is the hand-laborer, whose daily toil lies among levers and pulleys, or among the other implements of the artisan work. And if any one is interested in the laws of health, it is the poor workman, whose strength is wasted by ill-prepared food, whose health is sapped by bad ventilation and bad drainage, and half whose children are massacred by disorders which might be prevented. Not only does our present primary education carefully abstain from hinting to the workman that some of his greatest evils are traceable to mere physical agencies, which could be removed by energy, patience, and frugality: but it does worse — it renders him, so far as it can, *deaf to those who could help him*, and tries to substitute an Oriental submission to what is falsely declared to be the will of God, for his natural tendency to strive after a better condition.* * * Now let us pause to consider this wonderful state of affairs; for the time will come when Englishmen will quote it as the stock example of the stolid stupidity of their ancestors in the nineteenth century. The most thoroughly commercial people, the greatest voluntary wanderers and colonists the world has ever seen, are precisely the middle classes of this country. If there be a people which has been busy making history on the great scale for the last three hundred years — and the most profoundly interesting history — history which, if it happened to be that of Greece or Rome, we should study with avidity — it is the English. If there be a

people which, during the same period has developed a remarkable literature, it is our own. If there be a nation whose prosperity depends absolutely and wholly upon their mastery over the forces of nature, upon their intelligent apprehension of, and obedience to, the laws of the creation of wealth and of the stable equilibrium of the forces of society, it is precisely this nation. And yet this is what those wonderful people tell their sons:—'At the cost of from one to two thousand pounds of your hard-earned money, we devote twelve of the most precious years of your lives to school. There you shall toil, or be supposed to toil; but there *you shall not learn one single thing of all those you will most want (need) to know*, directly you leave school and enter upon the practical business of life. You will in all probability go into business, but you shall not know where or how any article of commerce is produced, or the difference between an export or an import, or the meaning of the word capital! * * * Very probably you may become a manufacturer, but you shall not be provided with the means of understanding the working of one of your own steam-engines, or the nature of the raw products you employ; and when you are asked to buy a patent, you shall not have the slightest means of judging whether the inventor is an impostor who is contravening the elementary principles of science, or a man who will make you as rich as Crœsus.

'You will very likely get into the House of Commons, you will have to take your share in making laws which may prove a blessing or a curse to millions of men. But you shall not hear one word respecting the political organization of your country; the meaning of the controversy between free-traders and protectionists shall never have been mentioned to you; you shall not so much as know that there are such things as economical laws.' * * * Said I not rightly that we are a wonderful people? I am quite prepared to allow that education entirely devoted to these omitted subjects might not be a complete liberal education. But is an

education which ignores them all, a liberal education? Nay, is it too much to say that the education which should embrace those subjects and no others, would be a real education, though an incomplete one; while an education which omits them is really not an education at all, but a more or less useful course of intellectual gymnastics?

"These be your Gods, oh Israel! For the sake of these net results, — our respectability — the British father denies his children all the knowledge they might turn to account in life, not merely for the achievement of vulgar success, but for guidance in the great crises of human existence. This is the stone he offers to those whom he is bound by the strongest and tenderest ties to feed with bread."*

In that direction in which the child is to pursue his employment and higher education in later years, should be the beginning of teaching in infancy. No student of law, theology, medicine, science, or the many new professions now taking shape in the material world, will be the less well prepared for his after training by possessing a knowledge of the elementary principles of natural history, physics, and the rudiments of the leading practical pursuits.

If the guardian could correctly read the child's nature, his predominating traits or propensities, a system of direct teaching would naturally be in accordance with such discovery, that the most rapid progress might be made; but wanting in that ability, the educational training of infancy and childhood should be a feeding, a leading out, a developing and strengthening alike of all the inborn faculties and self-activities of the child.

The time is past when a guardian or a school system may undertake to smother, repress, or bias the native powers of the child in favor of any calling or blind adherence to any belief or prejudice.

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* An address to the South London Workingmen's College, Jan. 4th, 1868.

Bitter experience has shown that spending the whole early years in a direct apprenticeship, to the pursuit or calling which the child is to follow in later years, is absolutely necessary to success, and the earliest possible discovery of the predisposition of the child and an entry upon a development in that direction is the business of the guardian or the system of educational training. If the study of the character of natural objects and materials, and of the elementary principles of pursuits, or the practice with tools and materials in their connection, were in any manner derogatory to the child's intellectual development, there would be reason against the adoption of such a system of culture; but, quite the contrary, these rudiments are the natural food of the infant mind, not taxing or tiring, but stimulating observation, perception, and inquiry, and developing and strengthening all the native faculties.

The germs of the inventive genius and the knowledge which is to direct the engineering achievements of the world in the future may be planted in the awakening of the observing faculties of the infant, in the study of curves and models, the toy windmill, water-wheel, aqueduct, the steamboat and the railway train, with immense advantage to future success.

Any child of ten years can comprehend the process of moulding and casting a lead or iron toy, and the process of perfecting it by filing, chipping, turning, polishing, or drilling. Every child learns the use of a knife, a saw, auger, hammer, and a chisel, and why not his mental store-house be filled with an elementary knowledge of materials and a systematic direction of these rudimentary principles to the world's pursuits?

Until within the past quarter of a century there has been no direction of intelligent effort to building up a national system of industrial development, and the nation has rather trusted to chance for the intelligence and skill necessary to the growth and prosperity of her industries, and to other

nations for the skilled labor and the products of manufacture.

America has heretofore rather directed the attention of the people, or suffered employments to chiefly tend to a superficial agriculture, and the growth of mechanical employment has been slow and the need of a system of industrial teaching has been less apparent. The great opportunity of the American nation has been frittered away for years, and the prosperity attending the employment of skilled labor in fine production has been given to European nations. The advantages which of right belonged to the American people, had they but chosen to claim them, have been neglected, and hardly yet is there any intelligent systematic effort toward the origination of a system of industrial national economy.

Heretofore the chance apprenticeship, and the importation of skilled labor have been depended upon to supply the requirements of the growing industrial pursuits. But the time is at hand when neither the employer nor the employed are to be contented with partial education, and when mere hap-hazard apprenticeship will be looked upon as it deserves to be, as but a very poor make-shift or foundation for a life pursuit, or excuse for exact knowledge. The industrial pursuits are also to require a greater number of intelligent workmen as well as those of greater mechanical skill.

If the United States is to take her position as the first industrial nation, an improved system of educational training is imperatively demanded of the representative minds of the country. If there exists a willingness to do justice to the claims of the rising generation for intelligent employment, then this improved system is an immediate bounden duty.

If America solves the question of industrial employment, stops the growth of idleness, discontent, and labor riots, it must be by supplying the children with the rudiments of a

practical useful knowledge of materials and pursuits, and thus enabling them to engage in that great variety of higher industrial employment which the resources of the nation offer.

The industrial history of the world is the history of the real progress of mankind, and shows that the greatest prosperity has always attended the highest skill. If, then, America is to lay the foundation of a worthy industrial history, and that of a sucessful people, the character of that foundation is plainly to be understood. A broad territory, with every resource of material, and every opportunity of soil and climate, the country but sparsely settled, a large portion of the territory lying idle, or but partially productive, the raw materials and provisions exported when they should be consumed by a denser, more industrial population at home; many of the articles of necessity imported when they should be produced; when they would be, were the people but informed of the process; a large portion of finer articles imported for want of a high skill to manufacture: these are but a few of the evils following a neglect to enable the people to intelligently engage in industrial operations.

The nation cannot longer neglect to furnish the people a practical knowledge of their life pursuits; it must also compel attendance at such a school training. The best argument against compulsory education, at the present time, is the very natural one, that the country has no education of value to give. To force a child from the merest "slop-shop" experience to the meaningless routine of the present public-school teaching is a greater crime than leaving him to his task, which, though without polish or exact knowledge, may impart some slight degree of practical information. For the child born without means to support himself in an elegant uncertainty, the training of the street *gamin* is far preferable to that of the present "finished education."

A large portion of the disasters overtaking the industrial ventures in the United States, is directly attributable to the want of skilled workmen and skilled managers, men possessing a knowledge of materials and the practical requirements of the undertakings in which they are engaged.

The common schools in which these persons received their education made no mention of what a workman most needs to know, and how can there be anything resulting from the irregular acquaintance with tools and materials which chance should give beyond the "Jack-at-all-trades," of whom the world is now so full? What else could be expected to grow from the seed which was planted?

Not that the workmen are to be blamed, nor those who have invested millions in the disastrous undertakings! their educations were all that the nation afforded, and they have built far better than they knew! Aside from a few able technical works, upon special materials and special construction, generally so technical as to be beyond the understanding of unprofessional persons — aside from those, and the few, very few really scientific periodicals, there has been no means of obtaining even a knowledge of general principles, except through this bitter experience resulting in disaster.

A few self-active, self-inspiring minds have, by the closest application, grown from uncertainty to certainty; from blunder to success; from *a love* of knowledge to *its possession;* from a natural self-creative intelligence to actual creation; and to these the nation owes her present reputation, her present position, not high, but considering her youth, respectable. These few self-made men know the nature of the earth upon which they dig, the mineral products for which they have use, as well as what is required in their production and manufacture. But the number of such persons is small, how small! When will the number be greater?

CHAPTER II.

A NATIONAL CULTURE.

Why a national culture? Why a system of education and culture adapted to the requirements of one nation, not equally adapted to the wants of all nations? Nations differ in respect to their locations, near to, or remote from, other influential nations, in respect to their surroundings and relations with other nations; with or without conditions or opportunities for independent operations; in respect to governments, as well as to commerce and materials of production or manufacture.

The United States have all the conditions of climate, and wealth of resource and production of raw material and opportunities for manufacture, and the complete occupation of an extended territory remote from other national influence, enabling the people, and rendering it incumbent upon them, to be almost wholly independent of all other nations, and should be self-contained, self-active, self-developing, and self-sustaining.

The people of the United States have also a system of government differing from those of all other peoples, issuing directly from the people and executive for themselves; equal in its relations and bearings upon all conditions and localities. A government in which race and caste, or distinction of birth or title have no influence. A relationship in which the public school is the common source of an equally available general intelligence, and the only basis for an equal preparation for participation in industrial pursuits, or in positions social or political, and of profit or honor. A relationship not existing in any other nation, of man to man in absolute equality of condition and opportunity. A new country free from all embarrassments or restrictions; a sparsely settled territory possessed of every possible resource of material and power and opportunity for achievement and employment; waterways and railways giving a system of transportation and commerce not comprehended

within any other nation; the full occupation and perfect development of which are absolutely necessary for the welfare of the people. An intelligent system of educational and industrial economy absolutely necessary for an evenly balanced and systematic production and manufacture. An unlimited opportunity for individual achievement and enterprise; a field where ambition has no impassable barriers to success; where there is every incitement to action, as there is every possible freedom of individual effort.

"Freedom, that is an absence of all the restrictions which can prevent men from using to their advantage the powers which God has given them, is the weightiest of all the conditions of progress in civilization and culture. * * * It can hardly be doubted that amongst the people of the North American free states all the conditions exist for their development to the highest point of culture and civilization."*

Had Prof. Liebig added that nature has in America brought together the materials with which and upon which to labor, and a condition of their necessity for man's use, and adapted to the highest exercise of man's individual powers for calling out every exercise of faculty and generous impulse; for inciting to the greatest activity every noble purpose of man's nature, as well as giving him untrammeled opportunities, he would have largely defined the conditions existing for, as well as the idea which is intended to be conveyed by, the phrase "a national culture."

The American continent was happily reserved for an intelligence, and a time in the world's progress when it could be entered upon as a national domain sacred to the freedom and equality of the human race, to afford an equal habitation of prosperity, and the American people now have every opportunity, every incentive, and every reward for the highest efforts toward building up a great, uniformly and completely

* Address before the Royal Academy of Science, Munich, July 25th, 1868, by Prof. Liebig.

developed industrial nation, and for establishing a standard of humanity and a breadth of culture far beyond anything at present comprehended.

In the nations of Europe the overwhelming interests are those arising from the possession of hereditary wealth and the management of enormous estates, and culture is rather an affair of the employments and pastimes of those favored with affluence and enjoying an elegant leisure, at the expense of the toil of a poor peasantry, who can never change in position or condition; an affair of the acquirements of a titled and privileged nobility, in whose hands the conduct of national affairs is exclusive and forever to remain; an ignoring of the advancement of the common people who never can enjoy this culture, or the positions to which it would otherwise entitle them.

Contrary to all this, in America the great overshadowing interests are the industries of the nation, common to all classes, and culture is the crowning result of an advancement from the ranks of the common people through their own self-achieving, self-active efforts toward the highest positions, and comes from an exercise of all man's faculties in the national fields of industry. In the old nations culture and positions are bestowed upon the titled few, in America the inhabitants must make their own positions and culture.

The purpose, then, of a national educational system should be to prepare the people for the fullest comprehension of the opportunities offered, of which they may take advantage as stepping-stones to advancement and for a material prosperity. Culture in America has its foundation in the engineering and industrial achievements and enterprises; in the scientific research and the invention and improvement of the means adapted to these results.

Not that Americans need only the knowledge of America, they must profit by all previous knowledge, and apply the intelligence thus gained to the avoidance of evil, and to the protection and advancement of individual and national welfare.

In America, as nowhere else, the common people have their fortune to make, have their whole interests in their own hands, and have an unlimited extent and variety of individual and national opportunities, arising from the greatest diversity of climate and natural products, requiring the widest knowledge and consideration, the most perfect understanding and comprehension, and giving the widest field of enterprise and opportunity for the highest achievement. These interests must all be considered, guarded, and advanced, not any one at the expense of any other, but all uniformly and looking to a perfect development, and an evenly balanced system of agricultural and manufacturing production. A production which assists or is assisted by a manufacture, and a manufacture which assists a production, are mutually advantageous and equally deserving of attention, as these interests together comprise a very large part of the employment and welfare of the people. There are also individual and special interests possessing claims to the care of the people of a nation; as in the development of the human being, physically or mentally, no faculty can be neglected, so no possible opportunity for practical employment is beyond the nation's consideration.

In America the people alone have these interests in charge, and the just claim of all sectional and individual interests necessitates a peculiar breadth of culture and a just consideration, even if patriotism did not prompt it. The people can alone set on foot the researches, experiments or inventions and improvements for the development of any enterprise or latent resource. No dictator can here command the establishment of an industry, or the prosecution of an achievement, no king direct that the material wealth of the nation shall be employed in the opening of river, mine, or product to man's use, but the people must of themselves care for the welfare of each locality.

To prepare the people for this breadth of comprehension, the children must be educated with the prospect of an in-

terest in the welfare of the nation; must be given a knowledge of its character and resource, and of its products, and be prepared to take part in any one of its many active pursuits. The child must be enabled to give himself interested employment; to possess a part of the national domain; have interest in, and be a part of, the state and nation, and capable of judging and comprehending the interests of each.

The industries of the nation are the employments of the people; the object of the education and the foundation of the culture of the people is the development and prosecution of these industries. The nation is yet in a condition requiring thousands of new industrial enterprises, small and great, which may be planted and grow up, and in which hardly more capital than intelligence and a high degree of skill is necessary to establish and prosecute them to success.

Beyond these, education is also an affair of insuring the high condition of material production, of preserving a condition of perfectly healthy surroundings for the people, of a continual restoration and renewal of the fertility and of the growth of industries and of the youth of the nation. Beside this, education is an affair of promoting success in each and every consideration of life; of a comprehension of the progress of society and government as well as industrial progress, and the progress of science in the arts of peace and war.

Who will say that the education of American youth should not be emphatically a national education, based upon the necessities and opportunities of the nation, offering an acquaintance with, and a preparation for, engaging in pursuits which will in some degree be a guarantee of success? Who but will comprehend the opportunity and necessity for such an educational system as will tend to magnify the importance of a culture based upon the grand achievements in the fields of scientific research and the discovery and invention pertaining to the full industrial development and building up of a great nation?

CHAPTER III.

The Education of Girls.

In the foregoing pages occasional reference has been made to an educational training in which both sexes might be included, and, in a great variety of industrial teaching, the general principles would equally apply, but, while agreeing in character, the employments of the two sexes must more and more diverge, as the industrial world progresses; the masculine employments remaining to the coarser hands, while the lighter, more effeminate indoor pursuits will more and more accrue to the more delicate constitutions. The elementary education may, however, be together, as the incidental knowledge gained by mingling with the rudiments of other pursuits will rather benefit than injure; or, education may be separate, as the machine-shop is separate from the manufacture of the artistic articles; but in the principles of educational training they are essentially the same. The girl's mind, as the boy's, has its natural bent in observation, copying, and in drawing, designing, and creating.

With the varied production growing out of the more active industrial condition, the necessity for educated female labor is also urgent, while the female mind has equal claim with the male upon the public-school system, and also to the employment in the production of articles of commerce.

It is no longer true that woman has no sphere of activity, no opportunity—the industrial world is open to her efforts, is one half hers, and an equal skill is demanded in her artistic workmanship as in that of man. The coarser labor of outdoor or indoor pursuits will, as now, always fall to the lot of the uneducated, unskilled of both sexes, but the lighter, more skillful and artistic employments will be looked forward to by those who are prepared for them by increased intelligence.

There are pursuits, like agriculture, mining, and transportation, in which women have no necessity to engage, although many a man looks back to his mother's garden as the nearest embodiment of his idea of Eden which he has ever been able to discover. The employments in which women will and may eventually contend for supremacy are many. The more delicate machinery becomes adapted to the almost automatic work of producing light articles, the more the nimble and physically better adapted female fingers and minds of quicker perception are to be required.

In the great variety of indoor manufacture of textile fabrics of cotton, linen, silk, hair, paper, and gutta percha, straw, weaving, knitting, braiding, and in the production of the thousands of articles of pins, needles, thread, lace, and fancy goods, the women are to have an industrial world equal in variety, if not in extent, to man's; equally requiring educational preparation, and offering equal opportunity for advancement and achievement.

In taste, art and design, in decorating and ornamenting fine articles, there is no reason why woman should not have equal employment and equal success.

The education of girls should, then, be enabled to be in keeping with the objects for which education is sought. It may be for ornament or for use; for the fine arts or the useful. As there is to be no restriction upon woman's aspirations, so the common school should afford her, equally with the male sex, a knowledge of the rudiments of industrial production, and enable her to continue in such further course of study and practical training, or such pursuit, as taste or necessity suggests.

As society progresses in its recognition of the honorable position of all industrial pursuits, so will an industrial school system, when once established, continue to progress to a fuller and more definite condition of useful practical education.

CHAPTER IV.

Hints toward a National School System.

Any school system which does not recognize the fact that the child comes into the world possessed of germs of activities and faculties waiting to be developed and strengthened, and that these powers are capable of such development, and are peculiar in their character to each child, is not based upon a proper foundation for a system of educational training, nor is such a system adapted to the preparation of youth for the pursuits in which they are to engage or for the positions they are to occupy.

To suggest a system measured by this standard, or such a modification of the present public-school system as to adapt it to teaching the knowledge and giving the practice demanded for preparation for the growing industrial opportunities of the nation, is not an easy task. Had the present system been continually modified; and had it grown and extended with the growth of knowledge which invention and scientific research have continually furnished, the transition would have been less violent and more easy of accomplishment.

As it is impossible that nature should endow the infant with useless faculties or powers, so justice demands that, so far as the state is interested in the child's training, it should be in the direction of the most complete, uniform development of all the powers and activities possessed.

Not that each child should be made into the same kind of a machine, or into any kind of a machine, but that each should be aided and encouraged in the development of his peculiar self-active, self-developing, creative individual character. To indicate with any degree of fullness what that peculiar system of development should be, would require to comprehend the great variety of characteristics and the varied individual natures with which education has to deal.

Instead of giving these in detail, it is enough to refer to them in general and to conform the training to a general incitement to activity, and to furnishing food in the shape of general material for all those activities to exercise upon.

Nature supplies the endless variety of material, of individual objects, and collective conditions of existence for the exercise of each faculty, each power, each sense of touch or observation.

The child's nature, common to all children, is a restless activity, curiosity, an inquiring desire for information in an endless variety of direction: a desire to observe, handle, comprehend whatever is before him, and the teacher and system of teaching have but to select, designate and provide the objects for that observation and comprehension, and lead on the child and systematize and regulate the times and manner of the exercise.

The child's nature grows, strengthens, and develops with his experience; increases in eagerness and ability of comprehension, and the system of schooling must be progressive, both in quantity and quality, from the smaller to the greater, the lighter to the heavier task, and from scarce a trace of system and classification to a perfection in both. In infancy this is afforded in the objects of play, in childhood of imitation, in youth of creation and construction.

This important faculty of creating is common to all children, but stronger in some, and is the chief principle of the child's nature upon which the system of educational training should be founded. Few children but will, after an opportunity of observing, attempt some construction, some creation. It may be a block-house, drawing a picture, making a wagon, or what not? the principle is the same, and in that ability to create rests one person's superiority over another, and to suggest, lead out, incite to activity, give opportunity for practice and the qualification which follows some degree of success should be the aim of the public-school teaching. A high degree of cultivation of the child's

powers in any special direction or pursuit is the affair of the child's later years.

No intelligent man but deplores the absence of material, practical knowledge in his education; no one but comprehends the need of such an almost entire revolution in school methods as will at least include the rudiments of the important branches of industrial employment. But how to so apply the new principles, how to so modify the old, effete system and fill up the almost wholly barren condition of what should be fruitful in winning the child's attention, and, unconsciously to himself, leading him to a growth and development of a personal identity; giving him a confidence which shall make him a self-active, self-restraining, self-directing power to himself?

The principle should prevail in America that every public institution, if not for the protection, should be for the education of the people. The nation can have no interests beyond the interest of the people; have no aims beyond their welfare, and in the two systems of correcting evil, and in furnishing schooling to the young, the whole object should be to render them useful citizens. In the prisons, the asylums and workshops, the first principle should be education. What is now done by awakening fear to deter crime, is needed to be done by inciting an ambition to be otherwise employed.

The public school should be for preventing the necessity of the existence of reformatory institutions, and so far as schools are complete in their results, the other institutions will be unnecessary. When man has self-control and an intelligent self-direction, and employment, there will be little need of asylums and prisons.

The children should not now be forced to commence where the ancients began, where their fathers began, and plod their blind way by themselves, darkly, through the mazes of uncertain experience; but should be enabled to tread by all the lights of science and history, and be enabled to pur-

sue to other experiences. It is now apparent, that the development and systematic training of the child's faculties may be better done in contact with things similar to what nature has provided as the companionship of life, material things, as giving the child a tangible world to pin his progress to step by step as he advances.

The years spent in studying abstract subjects, where no object rests or invites the eye of reason, are not the years the child will remember with pleasure, look back to as furnishing the genial food of his mind, and it can no longer be affirmed that lessons committed to memory from books, and having no possible comprehension in the mind, can be called education.

"The easiest efforts of comparison are made when the objects are objects of simple perception, and if nature dictates anything on the subject of education too plainly to admit of mistake, it is that children should first be taught to compare by the help of visible things. * * * When we impose upon the intellect of boys a burden like that of the grammar of the Latin or Greek language, we overtask them as much as we should overtask their bodily strength by requiring them to go through a gymnastic exercise with a club of thirty pounds weight. They can lift the burden no more in the one case than in the other. They do not lift it, though we may persuade ourselves that they do, because we tie them to it and leave them there. And by this I mean to say that the study of Latin and Greek between the ages of eight and twelve does not really serve the educational purpose that it is supposed to do, does not really occupy the reasoning and reflective powers of the mind, but exercises almost exclusively the memory. But then, if it does not do this, it does something worse. *It blinds us to the fact that the educational process is not going on at all, at the very most important and critical time in the youthful learner's life!* It prevents us from perceiving that the mind which we are endeavoring to train, refusing a task to which

it is unequal, remains inactive, except in the very humblest of its faculties. It conceals from us the unhappy truth that the perceptive powers remain dormant or sluggish; that the powers of comparison, analysis, judgment, and reasoning are never called into action; and that the period of life when habits of life are most easily formed, when in fact they must be formed or never formed at all, is passing away unimproved."*

"Beginning, then, with this body in which it has pleased our Creator to give us our earthly dwelling, it evidently needs a careful training to develop its full capacities and powers. The senses are capable of education, even smell, taste, and touch, much more hearing and sight. Our ordinary modes of education do not do justice to these powers; but on the contrary, ordinary schooling, by confining children to books, and withdrawing their attention from visible objects, rather tends to render the senses less useful in conveying impressions to the mind.* * * The need is of skill rather than of power; of skill which arises from habit; which being the remembrance of previous efforts, is precisely analogous to knowledge.* * * If education is to develop the mental powers, then those powers must have a legitimate field of exercise. There must be truth that is worth knowing, and work that is worth doing, and that work cannot be done unless the student gain knowledge to guide his power. The acquisition of power without knowledge is not therefore desirable."†

Educational training should, then, be the use of such means as will strengthen the faculties, incite their activity, and at the same time supply the child with the knowledge as well as the practice with objects and materials to fix and illustrate that teaching.

"That the knowledge which has been given to the world in such abundance during the last fifty years should remain,

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* Dr. Barnard. † Dr. Hill.

I may say, untouched and that no sufficient attempt should be made to convey it to the young mind, growing up and obtaining its first views of those things is to me a matter so strange that I find it difficult to understand it.* * * Take those minds (of men who have been highly trained, and have great literary proficiency) and apply them to the special subjects which they have never touched upon, or known of, and they have to go to the beginning just as the juvenile does.* * * They are ignorant of their ignorance at the end of all their education."*

Evidently these illustrations serve to show us what education is not, and sometimes telling what education is is best told by telling what it is not. The great evil of the present educational system is the wasting of time upon subjects not at the time fully comprehended by the young mind; cramming it with indigestible food, food which never becomes assimilated to the practical understanding, but fearfully over-distends his brain stomach, preventing it from afterwards receiving such intelligent practical knowledge as would be of value, and, forced to toil in matter and surroundings not congenial, and kept from the pleasant fields of its natural bent, the intellect never becomes proficient in any pursuit; while later in life it finds itself drifting unconsciously away to the green fields of its early sympathies, lost, misguided, weighed down by some incubus, and never recovering its congenial path-way and never successful. How many of those unnaturally-toiling minds there are, the world may not know. There are no voices returning from those once sepulchred in the dark halls of false teachings to admonish of the need of change. When the faculties and inclinations of youth are stunted, seared, or smothered through unnatural burdens, or neglect and continued antagonism, and forced to take on a false condition, the dead genius rarely rises up to be revenged.

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* M. Faraday.

It is only by observing the adaptability of man for producing, and the necessity for such production and employment, and the practical industrial pursuits and requirements of the country offered for this employment that we can determine the purpose and kind of education to be supplied to the infant minds. By an organized system of observing these wants and an effort to build toward their fulfillment, we discover the material and process to be employed in this educational training.

The first object is employment—success. The materials are the products of the earth, the mine and the adaptation of these to man's requirements.

The object of this public-school system should be to insure to the child the right commencement of a preparation for these actual pursuits of life; to render it certain that the child shall not want capacity as he has opportunity for some industrial pursuit. The early familiarizing of the child with what he is afterwards to labor, begets a confidence, readiness, and quickness of perception and comprehension, for the absence of which no after training or application can compensate.

The position in which the child's education is to be of service is to be amongst the actual affairs and materials of the pursuits of life. These materials are the products of nature: the earth and its treasures, objects of natural history; the physical sciences, the powers of nature and their subjection and use for man's comforts and necessities. Education should then be such a training as will enable the child to use the peculiar faculties with which he is endowed by nature, in the sphere and pursuit most congenial and profitable.

To what extent the public-school system should carry the preparation of the child, and in what special pursuits, how much for mere usefulness, how much of preparation in the higher branches of any pursuit, will be determined by the length of time found to be required to afford a certain de-

gree of intelligence, and that intelligence should be measured by the comprehension acquired of the rudiments of practical pursuits. The child should be enabled to continue his education alone, be enabled to enter the industrial pursuits or an institution furnishing a higher system of education or training.

It is necessary to point out the path-way and to set the child's feet in the right road. To determine that road or the final object to be aimed at, we must take the present standard of culture found in the leading engineers, mechanics, inventors, and scientists as the highest, furthermost point of desire, and the path of culture leading in that direction is the road to be taken and the kind of training necessary to enter this path-way is the education desired.

Having this as the final result, we must use material to build to it. Ascertaining what these leading minds have had to become master of, tracing backward step by step from these high positions, we shall find the stepping-stones by which they ascended and at last come to the knowledge of what must be mastered in this final result. The engineer is the result, the infant mind the starting-point to begin with, and a line drawn from one to the other will inevitably pass through the conditions of activity, the field of operations and the materials of practice to which attention must be confined. Happily the records of achievement have furnished the knowledge for guidance, and more fortunate still is it that in a system of infant amusement already partially established we have the beginning of an observation, a development, and of a system and classification rendering the filling up of the intermediate teaching all that is necessary to supply a most perfect system of primary education.

When we find what advancement the child has made at leaving the kindergarten at seven years of age, and the kinds of knowledge he has been able to master and comprehend, we have a still more intelligent guide to the number

of years required, the kind of knowledge and the material necessary to obtain the desired results.

A careful study and comprehension of the kindergarten process will convince all intelligent minds that the true foundation of a system of practical education has at last been furnished; that the solution of all the difficulties attending the question of child education has been reached; and whether entered upon in mere infancy or in childhood, the principle is correct, and a degree of efficiency sure as compared with the time and condition of the child's knowledge at entering upon the course. If preoccupied by false teaching — false impressions, or the mind overgrown with weeds, the labor of securing a complete result will be proportionately greater. It is a system in which all children should enter. Those entering in infancy fill up their years naturally, those entering later must labor harder, and with a closer application to accomplish the same results.

The kindergarten is in some measure antagonistic to the common schools, and having its sphere rather in the years of infancy, has not yet had its full weight, while its full practical results and the inevitable aim towards which it is tending are not yet fully comprehended. The kindergarten is the first opening of the creative idea, which is to end in the engineering achievement. The first dawn of development, of classification, systematizing, disciplining, forming, constructing, designing, creating, which is to grow and expand in character and definiteness during life.

The aim of the kindergarten system is to arouse, awaken, lead out the faculties, powers of observation, perception, concentration upon and comprehension of material things and their characters and relation to each other, to strengthen and feed those slender germs and give them character and purpose. The child's nature is activity and the aim is to systematically incite this activity, to educate

the senses, lead them to a keen and exact development, afford a quickness of perception, comprehension, and judgment which can never be destroyed.

The material is natural objects, and the child is brought face to face with what he is to observe or comprehend. Here he is allowed to see, hear, touch, and handle, observe from what he himself teaches himself, comparing, perceiving variations of form, color, weight, density, and given the first knowledge and practice of real valuable things and supplied with valuable rather than invaluable knowledge exercised and employed to a purpose rather than to an uncertainty.

The child's whole nature is employed, filled, occupied with food perfectly adapted to its simple comprehension, digestion, and to awakening the germ of intellectual comprehension which, while shaping his curiosity, enlarges, expands and strengthens the whole individual nature.

The results of the kindergarten system are "Good physical development, quickness of invention, and fertility of imagination and resource, a keen sense of symmetry and harmony, great mechanical skill in the use of the hands, ability to form rapid judgments in number, measure, and size at a glance of the eye, initiation into the conventionalities of polite society in their demeanor toward their fellows, and in the methods of eating and drinking and in personal cleanliness."*

This when the child is from five to seven years of age. What more has our highest culture of the present time?

"Frœbel's central idea is the recognition of man as an active, working, creative being, and the definite intention of his system is to educate men and women who will not be satisfied with *knowing* unless it results in *doing;* who will bring all their knowledge to bear upon their activities, and

* Report of Board of Public Schools, St. Louis. (Wm. T. Harris, Supt.)

who will value themselves, not by the *amount of information* they have obtained, but by the *original thoughts they have created* or the practical force they have applied. * * * It remained for Frœbel to ground a system of pedagogics upon this basis, and to strive by an organized scheme to develop and intensify creative power. The means employed to attain this result can only be appreciated by those who thoroughly study the kindergarten gifts in their relation, and sequence, and intelligently observe their practical effects. The results which have come under my own observation are surprising. In the Des Pères Kindergarten predestined engineers have built bridges as remarkable in conception as they were clever in execution: little mathematicians have discovered rather than learned all the simple relations of numbers; children with more than ordinary spiritual insight have intuitively seized the moral analogies of physical facts, tiny fingers have guided the pencil to trace beautiful decorative designs; and soft clay has been fashioned into flowers, fruits, and animals by the dextrous hands of embryo sculptors. There was no child who could not find in the varied material of the kindergarten some expression of his individuality, and the general results were the formation of habits of industry and persistency, the development of the mind through the exercise of its powers, and the production of that spirit of contentment which must follow wisely directed and applied activities." *

The effect of the training of the kindergarten upon children who have afterwards entered the public schools was to give them an intelligence, a quickness of perception and comprehension rendering it impracticable to teach them alongside of others who had entered without this training. "They submit more readily to school discipline, they discern accurately, seize ideas rapidly and definitely, illustrate readily, and work independently, leading every class into which

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* Report of Public Schools, St. Louis. (Miss S. E. Blow.)

they are received. They show special aptness for arithmetic, drawing, and natural science, have quick comprehension of language, and express their own ideas with accuracy and fluency." *

The materials and practice of the little hands in the kindergarten are but the miniature representations of the actual materials and practices of the industrial world, and of real employments of older people. The objects are objects of nature, the analogies the rudiments of the physical sciences, color, sound, form, harmony, and the adaptation of objects to form new combinations, new shapes, and creations of new wholes. These are, as well as for the infant life, the materials for the natural development of the youthful mind ever afterwards.

Instead of stunting the powers by neglect, the kindergarten system gives employment to every phase of activity, unconsciously inciting to a perfect self-development. It is not a system of forcing but of leading on, allowing the child to instinctively choose the employments congenial to his nature, and at the same time in no wise neglect any latent power, placing the self-active nature and the material together and allowing of self-formed conclusions, self-originating comprehensions and self-created results, insuring a self-confidence, self-reasoning, comparing, self-depending and self-controlling.

In this system of infant amusement we have the beginning of a complete awakening of the whole nature and energies of the child, and the problem of the later training is to continue that development until the child comes to maturity, perfectly developed, perfectly prepared for the intelligent employment of every power.

A further illustration and acknowledgment of the importance of this system of object teaching, enabling the formation of ideas by direct comparison with visible things,

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* Report of Board of Public Schools, St. Louis.

is found in the illustrated series of elementary books of reading and spelling, but coming short in only supplying the illustrations and not the objects themselves, in amusing and not instructing, and in only pleasing, while it instills few new facts or principles.

In the children's magazines recently established, where direct appeal is made to the child's growing interest in natural history and in many elementary illustrations of industrial and creative construction, the proclivity of the child's nature is again recognized, and we may hope that as the instructors of youth themselves become more complete kindergartners, the literature of childhood will still advance in congeniality toward the child's nature.

The infant years are the years big with important results. The seeds then sown are to take deep root and to grow vigorously and overshadow all other planting. Childhood is the period of inculcating by amusing, by playing, play-creating, play-acting of the pursuits of older years. Nature supplies the self-active principles of intellectual development, and the teacher must supply the material, must not repress, confine, or discourage, but incite and encourage to activity.

In childhood we inculcate by play, in girlhood, boyhood we educate by further gratifying the desire for imitation, construction, and creating, of which no child is destitute.

Having then the final result, which is best completed by a system of high technical instruction, and an afterward actual practice in engineering pursuits, and the beginning of a development of the infant mind as supplied by the kindergarten system, we have only to fill up the gap between seven and fourteen years with an equally efficient system of continuing and increasing the active exercise of the inventive and creative faculties.

But this intermediate season is the most important period of life. It is not only the time when the child's powers are becoming *able* to comprehend, but when the child *learns*

to comprehend, and when he receives the most important impressions of life.

The problem is how to continue this system, expanding and enlarging it as the child's nature expands, increasing in the means and materials, and widening in the application and development to keep pace with the requirements of a continuous growth of the youthful capacity. To engraft it upon the present public-school system would be to largely jeopardize its good effects. To place it at the foundation without any other change of that system would be to begin education aright and to afterwards smother it in the contradiction of mental abstractions. The problem can only be solved by building up a continuous new system based upon the kindergarten, and with entirely new material accomplishing results beyond and in advance, in keeping with the powers of the older scholars.

As with the self-activity of the infant the systematized creation of the engineer, so the youth holds an intermediate position with the same primary principles at work, the same incomplete exertions and desires for constructing and creating. But with the beginning of the training of boyhood comes a higher system of comprehension, and of the application of the faculties to a higher degree of creation and design. Invention begins to take the place of copying, or forming, and the system of educational training must begin at once to give actual operations and results from the application of the use of tools to materials.

Recognizing this necessity of continuous growth and indicating a few fundamental general principles upon which to construct, it is plain that no public-school system can be complete which does not directly recognize the importance of an acquaintance with natural history; an elementary knowledge of the earth and its treasures; of the cultivation of the soil and its products; of geology, mineralogy, botany, and zoölogy; the nature of materials and their adaptability to supply manufactured products, as well as the rudiments

of the industrial arts and their relation to man's existence and prosperity.

Not that a complete knowledge, theoretical and practical, of all these, is to be supplied to every child, but the rudiments of these pursuits must be furnished as the key to that general intelligence which is to enable the youth to pursue to success.

In this respect the child should be acquainted with the elements of

1) reading and writing and the construction of sentences, and of expressing ideas ;

2) drawing, sketching, coloring, modeling, designing;

3) carving, cutting, boring, filing, chipping, turning, polishing;

4) numeration, mathematics, elementary geometry, plane and spherical trigonometry ;

5) the growth and nature of plant life ;

6) materials, metals, compositions, fibres, and their use and products ;

7) machinery, water and steam power, electricity ;

8) physical sciences and chemistry ;

9) geography, history, commerce and transportation ;

10) rudiments of the German and French languages.

To construct a system of public-school training which will embody the elements of these subjects, is the problem of the present educational consideration.

Such a system must also recognize the fact that a much higher, more perfect system of collegiate technical education will be required than at the present time, for as much as the kindergarten child now leads the child entering the common school in self-confidence, quickness of invention and perception, and comprehension, so will the scholar from the new school system lead the student as now entering the technical school.

CHAPTER V.

Hints to Young Men in Self-culture.

Recognizing the fact that no training in the present public schools will more than partially prepare the youth now coming upon the field of action for active employment, a few suggestions may be given to young men in addition to the foregoing chapters with reference to the importance of a more definite and direct acquaintance with the principles of the materials and processes of industrial pursuits.

Science is merely, and no more than, exact common sense, exact knowledge. Genius is but an ability to concentrate and to apply the individual powers to the creation of such product as is desired. The disinclination to make application in any one particular direction may not indicate a want of genius, but rather a want of taste or inclination. Tastes are usually the indications of ability — genius. Goethe said: "Our desires are but presentiments of the powers which lie within us."

If a young man find in himself a greater faculty, taste, or inclination for any one kind of pursuit or creation, he is justified in determining that his genius lies in that direction, and in using every endeavor to engage in such pursuit; but he must guard against yielding to fancy for any supposed gentility or greater immediate profit or advantage.

Each and every employment is equally worthy of the attention of the young man, though the mechanical and industrial pursuits offer a more efficient and direct development and training of the intellectual faculties, and give a scope and breadth of comprehension and culture not afforded by any of the falsely called "genteel pursuits."

Man has no bent or inclination to produce or create which may not be followed to advantage, and success rarely attends any employment in which the individual does not wholly enlist all his energies.

The young man should, above all things, never rest satisfied with any common or ordinary product or position. He must not only execute, complete the designs furnished by others, but should labor to invent, improve, design for himself, to become a power rather than remain a machine. This is the principle inciting to achievement — success.

Whatever your employment, take care that your taste for any particular creation is gratified, exercised, employed at every possible opportunity. It may be in the direction of a simple toy, or a steam-engine, but whatever it may be, make the product the highest, most perfect of its kind in existence. Practice that you may give shape to your knowledge, and skill to your hands, and confidence to your judgment. There is no reason why the young man should deplore his inability to spend ten of his best years in a popular educational training; but to one who has thus almost wasted his youth and finds himself master of only the things which he has little need to know, and ignorant of the rudiments of the knowledge of those of the most service to him, there may be reason for regrets indeed.

Every graduate of any but the few technical colleges has but to begin his education over again, either directly or indirectly, must begin at the bottom and climb a rugged road. But the young man finding his best years still left him, when he has awakened to a knowledge of the fact that only a practical education is of service to him, has but to apply himself to facts, to materials, and an earnest effort to be master of any useful pursuit, and in ten years find himself possessed of facts which will stay by him forever.

The chief need is that the young man should have a restless determination to achieve success at all hazards. But that restlessness and desire for success is not of itself enough. That desire must be applied to a definite purpose of creation. Decide upon your taste and adaptability to the pursuit and fix all your energies upon it.

Success may not be immediate, but failure is impossible. Years of plodding in the employment of others may be imperative, but to rest satisfied with no hope of anything further than a life of servitude is to shut out from yourself the greater half of life's horizon.

Whatever your own peculiar ideas, maintain them and apply them with confidence.

Your association with the world will, as desired, modify or strengthen your opinions and, when so disciplined, make them your rule of guidance; self-confidence and self-dependence are most important auxiliaries.

As the labor progresses, and the first uncertain effort is made, the task lightens, the prospect brightens and the cheering rewards present themselves continually. Your sources of information and assistance are world-wide, the field of action untrammeled, and science has carefully stored up the results of all her labors where they may be freely possessed and examined, but remember, nothing is yours except what you fully master or originate. The knowledge of what science teaches will be found the entering wedge, the "open sesame" to a great fund of material, but it is what you create which is of value.

By a study of the earth and her products, minerals, animals, and plants, the properties of light, heat, air, water, steam, electricity, magnetism, and philosophical and chemical experiments the rudiments of a knowledge of untold future value will be acquired. The first and almost only difficulty which will be met with, will be a scarcity of the first simple introductory hand-books of instruction upon those subjects, and with no direct guide to obtaining a self-acquired knowledge, but an introduction will be found in the cyclopædias to the more technical books, and when once the lead is opened, the pursuit will be easy and the interest will steadily increase.

Remember that the bearing which knowledge has upon the industrial pursuits is the greatest source of profit and of

the most permanent good. The so long held belief that education should chiefly be directed to an increase of knowledge of ancient history, religions, manners and customs, and of literature and the fine arts, is now largely reversed; we should do our best to prepare the child for creating, by giving him a knowledge of the progress in the useful arts, the beautiful and the fine arts will always follow where there is skill to create or wealth to pursue.

The greater the progress of the useful, the more perfect the labor employed, the higher the education and skill of those engaged, and the higher the standard of the ultimate results.

A necessity to every young man's leisure hours is a purpose of creation, of producing something as well as learning about something. The knowledge of any one thing is widened by a knowledge of many things, and time is by no means wasted in extending the breadth of inquiry or examination. If a young farmer have a tool-house and a workbench, and a lathe and forge with a few tools and material, his pursuit will be doubly pleasant and he will be doubly well informed. The recreation in the one will offset the toil of the other. The boy employed in a shop or counting-room should have his recreation in the field.

A valuable auxiliary to self-culture is never to be satisfied until the nature, character, origin, condition, and government of each object are thoroughly known. A piece of coal, limestone, or of iron ore, a sprouting shrub, an insect or other animal life have each a history which would fill a volume.

As soon as the young man comes to comprehend that he alone can build his fortune and future success, so soon is he on the road to prosperity. Whatever he may have previously learned, whatever his qualifications, he must at once ask himself what calling, what path of usefulness he will follow. In that choice, we cannot assist him further than to say that the solid pillars of society will more and more become

those who produce something; who grow two blades of corn where one was before, who make a machine that produces double the work and at a more economical ratio, who ameliorate the condition of the ignorant and unfortunate, who secure health where disease now seems to hold sway. And each and all of these will be men engaged in industrial pursuits. They will be thoughtful, studious, industrious men who study the economy of the nation, the resources of the soil and the mines, who demonstrate the possibilities and probabilities of science and research, and who apply the laws of science to the production of all that supplies the needs or luxuries of a people, or gives a nation wealth by providing merchandise for commercial barter and exchange.

A man can be only what he makes himself. The relative height of a mountain is measured by comparison with those around it. The standing and success of a man is measured by his position in equaling or surpassing his fellows in pursuits which win, not only the applause of the world, but its acknowledgements of benefits received. The things most worth knowing are those principles which assist man in his progress. Employment is the greatest blessing a people can have, success in that employment is next in comparison; to be employed, the people must have the people's, the world's work to do, to be successful they must have the highest skill and the highest intelligence, to have that skill and intelligence every nerve must be strained to acquiring the knowledge of the principles and characteristics which give that control of material and its production. A nation or a people have only what they produce, their position is that which they themselves achieve; the greater the production and the higher its value, the greater the wealth and the higher the position. Theoretical knowledge, theoretical skill or theoretical science is perhaps a good stepping-stone to what is better, practical. Not that every man must of necessity be a laborer, but that man can direct best who can

perform best; if he would be a general, he must be a good soldier, the best sea-captain is the best sailor.

The research into the nature of the rock is getting the nearest to the sublime purpose of the Creator that is possible. The knowledge of how the plant grows and how to best assist it, the nature and possibilities of hydraulic power, the character and possibilities of steam and motive power, are problems that have tired and will continue to tire the greatest minds of creation. Culture is practical knowledge and the ability to apply that knowledge to a comprehension and comparison of the practical affairs of life. With the vigorous, forcible thought and spirit of invention and creation, and ability to measure the results and achievements of science which practical knowledge engenders, the possessor need have no fear of a want of culture. Application to the first principles of science and practical knowledge will carry the scholar to the highest position of culture and accomplishment. The first scholar in the graduating class of any college may in ten years afterwards be a veritable booby, so far as he or the world will derive any benefit from his knowledge of books, while the boy who never stepped inside the school-house may lead the nation in ameliorating and advancing the condition of mankind, and in science and engineering achievements.

What then, is the beginning of culture? Simply a beginning of an apprenticeship to that path of duty the student may choose. Practice is the quickest means of mastering your calling, but the hand is eased in its labors, is rendered lithe and skillful by an eye schooled in the study of forms, and a brain stored with a knowledge of the character of materials and of what has been achieved and how it has been done.

The business and pleasure of the world is in her ships, her railroads, her mines, her growing crops, her engineering designs and scientific results, and fine art is but great skill and good taste applied to the products of every-day

life. The finely finished engine and the fine drawing which illustrates it, are fine art examples. The beautiful park, or landscape garden, although it grow vegetables and medicinal herbs and oil-bearing flowers, is a piece of fine art, just in proportion as the taste and skillful design of the gardener is apparent. Not all useful arts are fine arts, but the common things may be elevated to an equal rank, and the fine arts are but the flowers that blossom upon the coarser stems of necessity.

Education is the password of admission to the highest ranks, and culture is the flower that crowns the more rugged, coarser plant of education; and education is to-day and for the future the practical knowledge of the acquirements and successful production in the industrial arts.

CHAPTER VI.

Health, Physical and Mental, the First Object.

Health, physical and mental, are, if not the most important, among the most important objects of the young man's consideration. Health of body alone, is not perfect health, in the desirable acceptation of the term. Without a full development of every muscle, every sense, and faculty, and function, man is not full of life—health.

Not to be diseased or not to be sick, is not necessarily to be healthy. The absence of disease is not all that is required. The presence of every fully developed faculty and power, and in its most active condition, is equally important. Mere existence is not health. Exercise, and through it growth, and development and ability to perform, are equally necessary to perfect health.

The healthful body in its full flush and glow of strength, vigor, and activity, is the parent of the healthful intellect. What is true of the development of the body as a requirement to a perfect condition of health, is even more true of the intellect. The intellectual powers are variously stimu-

lated by the healthful condition of the body, or depressed by the want of that perfect health, and very largely what tends to produce and preserve a perfect physical condition insures the greatest strength and disposition to mental labor.

The researches of science indicate no more efficient aids to intellectual pursuit than that afforded by the highest degree of physical health.

A young man possessed of a naturally healthy physical condition has but little else to do to preserve his health, than to observe regular temperate habits in all things. Active exercise of body and mind are also the natural association of health. To maintain this desirable condition a generous diet is required and at regular intervals for the purpose of restoring waste and re-invigorating the physical nature. Besides food, rest, or recreation, and sleep, there must be an increase of exercise and waste provided for, for the intellect is, not more than the body, complete in its development or strength at birth, but like the body, and along with it, it develops and expands under healthful exercise, and may so continue to do during the healthy condition of the body.

This growth and development of body and mind through exercise, is a necessary part of the young man's self-culture, and he alone can direct it to its highest results, but restoration from each day's fatigue should be such that the faculties feel increased stimulus for the succeeding day's labor.

The requirements of the fullest degree of health and development are that, excepting in recreation, rest, and sleep, the powers should never be idle. If the chosen employment does not supply the exercise in abundance, both physical and intellectual, it must be sought in other directions. Not spasmodic exercise of any one faculty, and for a single day or for one season, but regular systematic effort, always laboring, always performing, and endeavoring to surpass any previous results.

The opportunities for, or the ability to bring every muscle of the body into, healthful activity, are not common, and the evil of over-using one set of powers, and neglecting all the rest, is one of the great evils of an improper system of physical training, and the same is true of the intellectual powers, excepting that the instances of over-exertion are rare, from the fact that few persons have been brought to the exercise of any of their intellectual faculties to any considerable degree.

That wide scope of comparing, reasoning, solving and judging and creating in the various departments of the mathematical and literary pursuits are accomplishments which are rarely all found in any one individual. Few feel that anything like a full development of their faculties has been accomplished, or that but little, compared with what might have been done, has been achieved.

Rest, recreation, and sleep are equally necessary with food and exercise. When perfectly fortified by food and rest, take exercise. When exhausted, body and mind, take food and rest. Sometimes rest, or recreation is obtained by merely a change, that is by using one set of muscles, or faculties instead of another.

To one deeply interested in his labors they are of themselves cheering and exhilarating, and recreation is hardly a necessity. When both body and mind can be exercised alternately, the need of recreation is slight, but in this the most healthful condition of labor exists.

Sleep when sleepy, eat when hungry, and exercise when vigorous, are good rules of guidance. But exercise to a purpose, if possible. What that purpose shall be, the judgment must dictate. The great purpose, after all, of the full development of body and mind, is to enable the use of all the powers to the highest degree of success.

A divided intellect, a divided purpose will render any successful achievement extremely doubtful. If you would

drill a piece of steel, you concentrate the effort at a particular point and in the most definite manner.

One-idea men are the one-purpose men, men who make such a study of a subject and so concentrate their energies upon the one purpose as not only to master it, but to become authorities upon that subject, and a power which the world feels. The youthful mind which early discovers in itself an inclination and concentrative power directed to a particular purpose is on the high road to success. Let him pursue with confidence.

CHAPTER VII.

Care of the Passions, Appetites, and Affections.

In this classification we place those other faculties of the child, the germs of which exist at birth, and which have as yet had little attention in the direction of any attempt at guidance, development, or modification, but which, nevertheless, become the most influential powers in man's nature. Those emotional faculties—capacity for excitement, enjoyment, suffering, loving, hating — exert a powerful control over the individual, inciting to good or evil, requiring all the exercise of the reasoning faculties, and the judgment and consideration to restrain and direct.

These principles of human nature, hardly recognized in any educational systems, have an equal place in nature, and to prevent their becoming over-influencing, and controlling, must have direction, care, understanding, and discipline, must have food for health, material for exercise, and be made servants rather than masters.

There are two sources, means of this controlling care of the affections: the one resorted to by the old educational systems, and by the irregular restraints of the family, society, and the state, is that of moral suasion, fear of punishment, or the punishment itself. The rational means would be to prepare the child to become his own guardian,

give his powers right employment, and inculcate control and use, because such control and use and exercise are the proper end and aim of all faculties, powers, or principles of human nature.

Place the standard of the child's culture so high that it will be impossible for him to suffer pollution. Give the child a comprehension of the great active use of all his powers in such a direction, purpose, and to such useful results that he will scorn the approach of taint. Give the child so high an estimate of his intellectual, emotional, and physical natures, by showing him their proper field of employments that neither the moral restraint of society nor the fear of punishment from the state will be needed to remind him of his proper conduct.

The passions are the steam-engines of the child's nature; harnessed and directed, they become the most efficient aids to culture and individual success. And culture is not merely so much of books, so much of literature, and so much appreciation and love of poetry, painting, sculpture, and an ability to execute fairly in either one, but it is such an elevation of the human nature, the intellectual powers of reasoning, judging, and comprehending, and of appreciating the achievements of the world in elevating the standard of humanity in the relation of man to man in human progress, as to be above possibility of impurity, and in the daily life to set a glorious example to humanity.

Without a keen sensibility man is not half man, with it he will never waste his existence in vice. If the world had an educational system for the common people where it gave exercise to every limb and muscle of the physical nature, and the use of every sense gave activity to the intellectual germs in consideration, and employment, and use to their emotional activities, familiarizing the child with every conceivable condition and trait of his character, forcing him to self-control, self-direction, self-confidence,

and a just consideration of his nature, there would be no further need of special training.

Fill up and give employment to the child's physical activities in the observation and comprehension of material things, of actual combination, execution, and creation; supply an abundance of intellectual food and cheerful recreation; give the social activities actual employment, and inculcate a knowledge of the importance of health, temperance, and a sense of the value of high achievements, and of a keen appreciation and enjoyment of what elevates and advances humanity, and the educational system will be complete.

Upon the contrary, the old school systems laboriously endeavor to educate the child by repressing any exercise of the most interesting principles of the child's nature, by an effort to cover up and smother, to emasculate human nature of its humanity, and create, or plant upon it a training which could be of no service to the child, and of none to the world. The effect has been to destroy, humble, debase, and degrade, instead of elevating and ennobling. Any consideration of the affections or reference to them has been considered a sin, a crime.

But this is not the educational consideration which these permanent and powerful principles of human nature demand. When a boy, the writer was one day given a certain quantity of beans to plant, after which task the day was to be spent in a fishing excursion. After planting diligently until past noontide, and the quantity still remaining being large, with no prospect of a chance to go a fishing, a large flat stone was raised, a hole dug, and the remaining beans emptied in, and the stone replaced. Some weeks later, while cultivating the field, this stone was discovered to have been raised some inches, and the beans struggling out to day-light, broken and crushed, but still alive. So it is with any effort to crush or smother the affections; they are not destroyed, but break from beneath

their unnatural loads in deformities and unsightly excrescences upon the child's nature.

Every person recognizes within his nature a certain propelling force, a desire to advance, to achieve or accomplish, and also that that impelling power has its origin in his emotional nature, his affections, appetites, desires, his passions, which will not let him rest. Then how important that this powerful principle for good or evil be cared for, understood, directed! The more powerful these influences inciting to ambition, aspirations, and a desire for engagement, the more capable the child of progress and future great achievements. The child with most bountiful promptings to exercise, to activity, has the greatest store of that power of most use to him as a creative creature.

Is it plausible that nature planted these incitements in the child's nature to be disregarded, neglected, or smothered out of existence? Are they not rather implanted there to give animation, susceptibility, quickness of perception and comprehension, breadth and scope to the active powers?

Properly directed, developed, and employed, "trained to come to heel by a vigorous will," and having a purpose and employment laid out for them, because that employment is of overshadowing value, these passions, these affections, giving foundation for activity and enthusiasm, are the most interesting part of man's nature.

Society cannot afford to leave these powers, so potent for good, without care or regard that they be properly directed. If these appetites are not supplied with food, given supports and employments of a character to strengthen them for good, they will be fed and employed for evil.

The proper employment of man's physical powers is in production, creation, of his intellectual faculties, in reasoning, comprehending, judging, and that upon the material, and in the useful pursuits of life. If by skill and perfect

knowledge and workmanship he is able to so employ all his powers in successful creation, he will have brought his desires to be co-workers with him in these absorbing pursuits.

At the same time as becoming interested and employed as associates in these pursuits, these affections will become powerful incitements to self-advancement, to new efforts and new fields of endeavor, and that with double power, while the hand of toil is encouraged, cheered by the delight the nature has in the achievement.

The young man with his future to work out, must not see in his appetites a terrible monster of evil, a nature of sin, prompting to crime—"evil and evil continually," but should comprehend in every one of his faculties a useful assistance to a successful career. "Dowed with every passion, he must hold the rein and guide and direct for good." No appetite but has its office, no desire but may be fed, but fed for health, fed for use, and the enjoyment is perpetual, the use continual. The delicious viands are for healthful digestion, the beautiful exhibitions are to be enjoyed, the honor of high achievement is a just reward. The social relation, the healthful enjoyment of all the sensations, are a part of the purpose of nature. The anchorite who retires from the world, refusing share in the welfare of society is less than man. As society comes to make use of the principles of man's nature, comes to educate them, and give them employment, there will be a higher type of manhood and less of need of the policeman and the penitentiary, of the poor-house and the asylum.

CHAPTER VIII.

The Growth of Culture.

Intellectually, more assuredly than physically, man grows with what he feeds upon, and the history of the intellectual progress of the world is but a history of the progress of man in the arts and sciences, while these arts and

sciences are built upon and dependent upon the industrial progress of mankind. Culture may be defined to be ability to appreciate the highest results and condition of creative skill, and culture and creation must largely go hand in hand, requiring a perfect comprehension of what is achieved before there arises a power of inventing or conceiving results beyond.

As man's creative faculties had few objects of employment previous to the recent discoveries and development of natural powers, so culture had little foundation to build upon and few stepping-stones upon which to climb to a higher condition. In art, taste, and the amelioration of the condition of mankind through the progress of industrial achievement, the world may now be said to be rapidly building toward a higher culture.

As opportunity is given and progress rendered practicable, the activity in research, discovery, invention, and creation is increased, and as individuals explore, the world follows to a perfect occupation. This progress once instituted and the world's attention directed to it, becomes the inciting influence to still greater efforts.

In the discovery and mastery of the latent powers of nature, and their application to industrial pursuits, giving material and purposes upon which to exercise the intellectual and creative powers, man is given an opportunity to observe the continued progress of that intellectual activity called culture, and to share in its growth.

Few departments of the natural or physical sciences but are now so far explored as to be open to intellectual endeavor. Men are delving for knowledge in the earth, and culture is coming up to occupy, giving tangible objects upon which to fasten and from which to pursue to higher results. The printing-press did not spring in perfection and with its lightning speed at once into existence, but is the result of a growth, step by step, from the most primitive beginning, and the science, and skill, and invention necessary for this

at present astonishing creation has grown along with civilization, giving culture and the results of culture. Since Franklin brought down the fire of heaven to man, and Newton observed the steam issuing from his mother's tea-kettle, what a revolution in man's knowledge, what a growth of culture based upon the wonderful achievements following has resulted! What auxiliaries to the development of man's powers and footholds to advance his struggles for intellectual progress!

Not the growth of the printing-press, the telegraph and steam-engine, merely, but the myriads of occupations, pursuits, and processes of discovery, improvement, and invention afforded for awakening and expanding the human faculties, the artistic production, the engineering achievement, the scientific research, are the levers raising mankind, and above all, the incitement to an imagination, conception, and invention, still looking beyond present results. Open but the book of nature, and what treasures are brought forth! Awaken man's dormant powers, and what achievements follow! Develop, fan into life the latent fires of man's genius, give them fuel, instead of repressing, and smothering, and destroying, and the half of man's labors have not yet been imagined!

Ability, genius, or culture can hardly be expected to be given a child by circumstances never so favorable for exercise, but the opportunities and the training of a proper education will develop a power akin to genius, while without education or opportunity great natural ability may be wasted.

With the lights of science and a rational system of intellectual development, and the opportunities which the material world affords for profitable employment, the growth should be rapid. Secret springs of action will be apparent, leading to greater power, and a conscious, intelligent progress, rather than an uncertainty.

Man's culture grows with his power over, and the ability and opportunity to comprehend, material things, and the

present advanced position of scientific research is the most favorable to a much higher ratio of progress, not necessarily of instances of greater achievement, but of bringing the common people up to a condition and standard of education far higher than at present exist.

"Man is progressive, not only as an individual, but as a race. Here, still more, is his superiority to all other animals apparent. He is, in some measure, the heir of the discoveries, the inventions, the thoughts, and the labors of all foregoing time; and each man has, in some measure, for his helper, the results of the accumulated knowledge of the world. But the transmission of experience and knowledge from generation to generation is the fundamental condition of progress throughout the successive ages of the life of mankind. To a large extent, of course, we cannot but profit from the labor of our predecessors; all of those products, and instruments, and agencies which we style civilization: our roads, our railways, our canals, our courts of law, our houses of legislature, and a thousand other embodiments of the combined and successive efforts of many generations are our inheritance by birth; but the very guidance and employment of these for their improvement, or even for their maintenance, require ever increased knowledge and intelligence. The higher the civilization that a community has attained, the more, not the less, necessary is it that its members, as one race succeeds another, should be enlightened and informed. No inheritance of industrial progress can dispense with individual intelligence and judgment any more than the accumulation of books can save from the need of learning to read and write. But thousands of human beings born ignorant, are left to repeat, unguided, the same experiments, and to incur the same failures and penalties as their parents —as their ancestors. Where they stumbled, or slipped and fell, they too stumble, and slip, and fall, rising again, perhaps, but not uninjured by the fall. Nature teaches, it is true, by penalty as well as by reward, but it is surely wise,

as far as may be, to anticipate in each case this rough teaching, to aid it by rational explanation, and to confine it within safe bounds. The world doubtless advances in spite of all. That industrial progress is what it is, proves that the amount of observance of law is, on the whole, largely in excess of its violation ; were it otherwise, society would retrograde, and humanity would perish. This predominance of good results from the very constitution of human nature and of the world, by which the individual, working even unconsciously, and for his own ends, and learning even by failure, achieves a good wider than he contemplates, and by which progress, in spite of delay and fluctuation, is maintained alike in the individual and the race. But how shall the evil which yet mars and deforms our civilization, be abated, if not removed, while progress is made more rapid, and sure, and equable? Both depend alike upon the increased observance of law ; and it is by diffusing knowledge of its existence and operation that observance of law is rendered more general and less precarious. If, then, we would convert, not only disobedience into obedience, but obedience blind, unconscious, precarious, into obedience conscious, intelligent, habitual, we must teach all to understand the laws on which the universal well-being depends, and train all in those habits which facilitate and secure the observance of those laws."*

The opportune discovery of steam, electricity, and the perfection of the printing-press have happily marked a boundary, given a fixed point of record and departure, backward of, or behind which the ebbing tide of progress cannot go. The facility of recording and transmitting the results of invention and research already attained, that he who runs may read, has placed the preponderating influence upon the side of progress. Society, it is to be hoped, is at present strong enough through the achievements and examples of

* Dr. Hodgson.

her self-active minds, to maintain the impetus of enlightened progress on the right side and in the right direction, and to give to industrial progress, education, and culture a considerably increased velocity.

The application of science to discovery and research in industrial pursuit, instead of continuing in the metaphysical and abstract sciences, is more and more helping to fix and advance this progress in culture, and consequently in civilization. Whatever interests and furthers the individual progress to the extent that the discoveries in modern science and the invention of labor-saving appliances have done, must have a much stronger influence in providing for a transmission of that intelligence to the succeeding generations than when the mass of the people had little or no interest therein. Contrary to earlier times, and the older nations, the interests of the common people of America are now the chief interests of the nation, and it is to these interests that a better system of education is to be directed.

We find the desire for increased efficiency in educational training most largely arising from and in connection with the industrial pursuits; in fact, education and culture are at the present time inseparably associated with the affairs of the industrial world, and the two must advance or decline together.

If we name the pursuits a knowledge of which it is most necessary for the people to have, we shall name the present occupations or subjects of the occupation of the leading minds in scientific research and discovery. We shall also discover that the growth of knowledge is depending upon the inventions, discoveries, and improvements in these same industrial employments.

Agriculture, geology, mineralogy, metallurgy, chemistry, telegraphy, engineering—all carry with the mention of their names the records of the progress of science, and the subjects of the present anxiety, and of the active employments of the age. These subjects represent the present contribu-

tions to knowledge, the world's progress, and the growth of culture. The exact knowledge here obtained forms the stepping-stones on which the world of culture is to advance. The more we furnish the people an intelligence to comprehend the results of the researches in connection with these subjects, the more we enable civilization to work out its own progress.

"We find that extent of mental attainment depends not alone upon intellectual effort, but upon the order of relations among objects of thought. Of course, mental capacity is the first factor in acquisition, but that being given, the scale of possible attainment depends absolutely upon the order of the course of study. Education cannot make capacity, but it controls the conditions by which the least or the most can be made of it. If the methods of study be such that the mind encounters broad breaks in its course, and is abruptly shifted into new lines of effort, so that past conceptions are not carried on to a progressive unfolding, mental growth is checked and power lost. The extent to which one fact or principle is a repetition or outgrowth of another in the serial relations of subjects, determines the rate of mental movement, which can only become steady and rapid in continuous ranges of effort. As in the outward world the past creates the future, along unbroken lines of dynamic sequence and causation, so in the mental world there must be a corresponding continuity of movement by which the past creates the future in intellectual evolution."*

There is no truth more apparent than that the favorable opportunity for the active exercise is the parent of the increasing power of the intellectual faculties. Man is from his birth emphatically a self-active, creating being. As the child at once begins to construct a world of his own and peoples it with beings of his own creation, so with every advancing period of life. The perfect after-results, if perfect, are a

*E. S. Youmans, *Culture demanded by Modern Life.*

natural growth of the progressive activity, and in keeping with that growth and the expanding intelligence.

When Sir Christopher Wren built St. Paul's, he no more completely filled his natural creative soul than the infant does with his efforts and perplexities in his constructions from his building blocks and toys. It is the embodiment of his highest creative conceptions. When Capt. Eads filled his heart with his plan of a great bridge which is to remain for centuries a monument of enduring engineering science, it was only an example of a higher condition of growth, rendered possible by the previous exercise of his creative powers, and were an immeasurably greater, longer, larger, stronger structure required to span a canyon of the Colorado, there is no doubt it would be as easily planned and provided for, as was this bridge a few years ago. The creative mind never ceases to grow; it conceives a height, and when reached, mounts to a still higher, but only to construct there its platform upon which to further build. The great conceptions which industrial needs have rendered practicable, have reached a growth never before possible, and yet, standing at the present height, the conception is enabled to advance along a far greater future achievement, as a natural sequence, than what is already obtained.

Creation begets confidence for far greater efforts, and there is no such other power in the world as that breadth of grasp and wonderful insight to comprehend unknown existences, begotten of and following the confidence of successful achievement. As we learn to move the muscles dextrously in the performance of difficult operations, so the mind through success gains facility which is akin to daring and a courage almost amounting to superhuman performance. It will be because it must be. Napoleon's wonderful genius—and this is the principle represented in this wonderful power, this growth of intellectual condition, this faculty which is born of exercise, this parent of activity and creative ability—is an example of this intuitive insight seeing what is

and what would be, because it must be. An intuitive power begotten of activity, of creation, and which stops not at darkness, at mountains, or seemingly impassable barriers, is man's highest power. Involuntarily, intuitively, and unconsciously solving, inventing, discovering, constructing, and performing what to the world are impossibilities, simply from an impetus which overcomes and overwhelms all obstacles.

Few natures but have this predisposition to some particular achievement, which, when cultivated, exercised, becomes, if not true genius, then the power next to it. That the powers of the child may be immeasurably increased, and led step by step by exercise and growth to great results, is the principle of educational training, to which humanity must look, and upon which it must depend for the progress of civilization.

CHAPTER IX.

Skill, Art, Taste, Design, Culture.

A definition of skill would be the practical application of art and science to production. To so apply these in the highest degree of artistic performance, the producer must possess both the knowledge and the ability. If we were to define art, it would be "the possession of a nice power, or ability of adapting materials to uses," so that to be skillful one must have the art as well, and more than this, he must possess that nice power of perceiving and comprehending the perfection of this skillful production which is called taste.

A high degree of these acquirements enabling artistic production could hardly be possessed without a considerable degree of culture, for each acquisition implies more than a mere mechanical performance, it implies judgment, comprehension, and a nice perception, all of which can only come from a possession of considerable exact knowledge,

so that a certain degree of culture must attend every performance upon which skill, art, and taste are expended.

To have culture, it is not necessary that a man possess skill or ability for artistic performance; he need not be a skillful mechanic, or an artist, but he must have an equivalent in the possession of taste, judgment, perception, and exact knowledge.

It is not required that this taste, judgment, knowledge, or perception should be devoted always to the same pursuit; the same exhibition of ability in any pursuit equally entitles the possessor to be considered a person of taste and culture.

In older times persons of taste and culture, and the sphere of these acquirements were associated with creation in what was termed the Fine Arts—poetry, literary production, painting, and sculpture—and a man of culture was supposed to possess an acquaintance with the achievements of ancient times. Of later times, without asserting any particular claim to cultivation, our artisans, inventors, engineers, and other men of scientific research and discovery have been supplying the world with an exact knowledge and a wealth of artistic and mechanical production and creation of a character, which, while of estimably greater value to mankind, challenge comparison with any performance of the sculptor, poet, or painter, either as beautiful, or as influencing human existence, and the world is now called upon to furnish a designation by which this higher exhibition of creative ability shall be known, and we may question whether or not, at this time, and by common consent, the number of intelligent persons now employed in the adaptation of material, and the application of the powers and products of nature to the use of man in industrial progress, are not dividing this unknown quantity—culture--and sharing by far the greater half of its distinguishing honor.

If culture is that high development of the intellectual faculties and discipline of the individual capacities and powers, an acquisition of exact knowledge which creates a quickness

of perception, a breadth of comprehension, a high appreciation, ability to judge, and power of applying them, the pursuits awakening the fullest exhibition of these capacities must carry with them the highest claim to that honorable distinction expressed by the word "culture."

The merits of the fine arts in their peculiar sphere of elevating the tastes of mankind by their examples of beauty and taste, cannot be deprived of the credit of that influence, but a new sphere of intellectual development and culture, of creative production, has arisen with the progress of the sciences in their application to the industrial pursuits, to contest the honor, and the fine arts can no longer have the sole claim to culture, or the full credit of the progress of civilization. Other elevating influences, of immeasurably greater power, as they are more direct in their operations upon the conditions of mankind, have come into existence.

The worker in the fine arts can claim but little more as his original production than an imitation of nature, while in literature the student can, at the present time, hardly measure the sum of his obligations to scientific research, as associated with industry, for the wealth of knowledge he finds.

Without reference to the changed condition of the world resulting from the research, discoveries, and invention of the past half century, what would literature be in comparison with the present? What would culture be, if narrowed and confined as previous to that time?

It is true, we have no poetry of science; the world has not yet developed its poetical genius to explore the treasures of the mines, or follow the rhythmic measure of the ponderous world of machinery, although, as sculpture, and painting, and design have done, poetry may, by and by, build from the world of science and the useful arts.

The same human faculties which in earlier times found the development of the bent of their inclinations in mental philosophy, and the embodiments of taste in sculpture and architecture, have now the wider field of labor and more

varied material, as they have the wider auxiliary of science, and the natural growth from those faculties and that genius, are the discoveries, improvements, and inventions giving impetus to industrial progress.

The discovery of steam and the invention of the steam-engine have been the parents of a world of skill, art, taste, and creative genius which we now honor with the designation of "culture." The same may be said of electricity, and the same of the research into the material and powers of nature. While these have fixed and given tangible shape and existence to man's powers, they have also afforded objective material and the opportunity for forcing a more rapid progress in civilization.

As these have given employment to every active power of man, so they have developed an immeasurably broader, more comprehensible field of culture. It is contended that the creative powers now developing in the invention of appliances and the application of the powers of nature to systematic, practical results, are a higher exhibition of intellectual achievement than previously found in other callings, that the highest productions of human genius have been presented to the world through the perfection of appliances which are now working out our industrial progress. If this claim be admitted, and it can hardly be denied, upon what basis has culture the grandest material for exercise, and in what field is her empire henceforth to be found?

Instead of philosophical and metaphysical abstractions, instead of merely beautiful syllogisms, instead of fancy, fable, and imagination, we have exact knowledge, demonstrations, and creations which may be produced and reproduced, and continually transmitted to all future generations.

Probably no finer exhibitions of skill, art, taste, design, and culture can be referred to than have been found at the exhibitions of all nations with which the industrial world has been familiarized during the past few years. Besides being objects of high taste and design, these exhibitions have the

double value of aiming at an elevation of the human race, and, at the same time, an amelioration of man's condition, by bringing the powers of nature to minister to his necessities. These powers are to do man's labor that he have opportunity and leisure for culture.

> "I've no muscles to weary, no breath to decay,
> No bones to be laid on the shelf,
> And soon, I intend, you may go and play,
> While I manage the world by myself." *

In earlier times it was rather elegant leisure, arising from great wealth, affording the gratification of a taste for the fine arts, and culture was rather shown in possessing objects which wealth could purchase than in possessing the acquisitions of skill, artistic workmanship, or the ability or genius to produce or create. But with the extending field of science the definition of culture has changed, its sphere is widened, and culture is rather the power of creation, than power of appreciation, and the laurels of high distinction rather rest upon those engaged in scientific research and the prosecution of great engineering designs.

The young men of America have no longer insurmountable barriers to their entering the path-way leading to this high position of culture. The self-made men of the nation have broken down the barriers of exclusiveness, have built a far more magnificent empire, while the Goths and Vandals of the useful arts and sciences have overrun the old empire with a new culture in grandeur beyond any distinction or achievement of the past ages. To-day the fine arts are but the flowers adorning the "coarser plants of daily necessity," and culture is the solution of the problem of the application of science, skill, art, and taste to industrial progress and a higher condition of civilization.

Into the ranks of this army of industrial workers the young man may enlist at any time, and pursue to success;

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* *The Poem of Steam*, by Geo. W. Cutter.

he must comprehend, however, that culture is the result of a lifelong earnest toil and growth of knowledge, and which cannot be had without the earnest application of all his faculties. He who wins must pursue with vigor. More and more the standard is elevating, and more and more industrial progress requires the highest skill and an exact knowledge, to insure success. The powers of the gods of old have been brought down with the fire of heaven, to do man service, and it is to their mastery we must apply.

"Harness me down with your iron bands,
Be sure of your curb and rein,
For I scorn the strength of your puny hands,
As the tempest scorns the chain." *

CHAPTER X.

CONCLUSION.

The writer comes to the concluding pages of this little work with much of regret; for, although the labor has been a pleasure, he feels a keen sense of how incompletely he has been able to put his convictions on paper. There are, however, many practical, self-made men, as well as many others who have had to unlearn the teachings of the first half of their lives, who will appreciate these endeavors and comprehend the feelings which have prompted the writer.

Whoever has traveled over the vast extent of our national domain and observed the wealth of raw product of which the country is capable, the unlimited yet undeveloped resource still waiting for skillful hands and intelligent minds, and seen how imperfect are the appliances and the existence of the industrial arts, how much of skill, art, taste, and exact knowledge are yet required, and to what wonderful results these may be employed, will understand the anxiety which prevails in the industrial world with re-

* *The Poem of Steam.*

gard to the future educational training and its bearing upon industrial pursuits.

No other people have ever had such a complete world of resource, of power and material—such an opportunity for grand exhibition and achievement, but no other people have had so to struggle against overwhelming odds of an irregular national industrial economy, such a want of educated workmen, and none have had to more completely build the foundations of their operations, to so completely invent, discover, and construct their whole system of production. The present by no means perfectly adapted appliances are the work of men who have taken their education and culture into their own hands and have toiled under the most discouraging conditions.

The perfectly fitted workshops, supplied with machinery that varies not a hair, and not a second, the superintendents who know the character of the materials they use, and its adaptability to products, are exceedingly rare, while the perfect tools and appliances to produce and the intelligent, skillful workmen to use them are very few.

Until America cares for her industrial progress and seeks the development of her wealth of resources through an intelligent, systematic encouragement of industrial products, and the practical education of her children, the same unnatural struggle and doubtful results must continue.

A FEW WORDS TO PARENTS.

The great improvements made, of late, in our public-school system, and the facilities which it now furnishes for securing intellectual development are generally acknowledged. The opinion is, however, largely held, that in one important respect the public schools leave much to be desired. It is a fact, that the majority of the graduates from these schools, but more especially those scholars who drop out of school before completing the course, show a deplorable lack of training for the productive employments of life.

The reason of this, undoubtedly, is that the prevailing system of instruction concerns itself almost exclusively with mere book-learning. Addressing the *mind* solely, it ignores the *hands*, and the whole range of faculties of which they are the special instruments, and thus leaves the child's mechanical tastes and aptitudes totally undeveloped.

The present system is, therefore, one-sided and insufficient: it tends to make mere scholars, instead of being, as it should be, broad and comprehensive, *i. e.*, aiming to quicken and cultivate all the faculties, and to send out its pupils, not only with the proper amount of knowledge, but, also, sufficiently prepared to become *practical* men and women.

This objection, which is even more strongly emphasized by those who urge it, may not have all the weight that they imagine; but no one who fully looks into the subject, will fail to see that there is much in it entitled to serious consideration. Nor, probably, could the defect here pointed out have been thus long unheeded, had not parents been almost universally occupied with the desire to see their children enter

upon some profession or commercial pursuit, rather than to have them put in training for a trade. This is always done under the impression, as false as it is hurtful, that the former are more *gentlemanly* pursuits, and are the passports to a higher social standing than the latter.

As a consequence of the anxiety thus excited, not only has this error been permitted to pass without correction — almost, indeed, without notice—but the professions, in particular, are largely overcrowded, and the excess is constantly on the increase. Comparatively few can, by any possibility, rise to eminence in the calling which they have selected from a mistaken sense of gentility; and the superabundance of mediocrity often renders the earning of a decent livelihood extremely difficult—in many cases, impossible.

In this last event, mere professional education is obviously useless, not to mention the time and money it has cost, and the expensive style of living to which it necessarily leads. Failing in the direction aimed at, it fails, also, to answer the purpose of honest work in general; and, were it possible, this professional education would, in hundreds of cases, be gladly exchanged for any respectable trade affording a comfortable subsistence.

What is true in regard to this one-sided and insufficient education of young men applies with no less force to that of young women. There are, for instance, thousands aspiring to the position of teacher, who do not possess the requisite qualifications: consequently, their career must prove a failure, a hard and yet unsuccessful struggle, while in some other sphere—to them, apparently, less genteel—they would prove far more useful to the community, would have fewer wants, would be less dependent on others, and would be healthy, contented, and happy.

When a crisis in the life of a person comes, if he has been rightly educated, he may, with a fair prospect of success, enter any new field of activity for which he is fitted by skill, ability, etc.

It would seem, therefore, that a true system of education should include some development of mechanical faculties; so that, in case of need, a person might turn to an honorable handicraft for subsistence.

Social pride would, no doubt, interfere in many cases to prevent a resort to such an alternative; but, as things are now, even when pride does not stand in the way, the one-sided education that has been received renders any such course impossible. The mechanical faculties, which should have been trained from the earliest childhood, having received no attention, are inert, middle age has arrived, when their practical productive development is almost out of the question and the so-called "educated man," he whose chief or only capital is the diploma of a High School, College, or University, without employment and with no other resources, is left to starve, or to live on a miserable and uncertain pittance, while the youth brought up so as to be prepared to engage in any of the thousand mechanical or agricultural pursuits that are open to industry and ambition, has before him the prospect of a good living, if not of a liberal competency.

Does any one doubt the substantial truth of this picture? Tens of thousands in the United States, both native and foreign-born, to-day, in sadness attest its accuracy.

For a state of things so lamentable, so fruitful of disappointment and of misery, there are but two remedies. The first is for parents to rise above the senseless prejudice against trades as compared with the professions, to give up their antipathy or mistaken pride, through which they lead their children on to life-long and ineffectual struggles, and to guard them against expensive habits of living. The second is for children to be imbued, from an early age, with a love of work and mechanical occupations. They must be taught that as work in general, so a trade is, in itself, dignified and honorable; that manual labor is the sphere in which the great majority of the human race are destined to move,

and that it is mechanical genius and skill which have transformed the world, and which will ever command the highest prizes in the race of life. As there is hardly any thing worse, or more useless, in this world than a stupid, unthinking workman or an unpractical philosopher, let the early training of children be such as to teach them to use the hand in obedience to an intelligent will and a developed brain.

As it must be admitted that enforced idleness invariably proves more unsatisfactory than the hardest manual labor, and more destructive of head and heart than the most exacting brain-work, and as, moreover, no position is so unmanly or degrading as that of a healthy and able-bodied person who, in the possession of all his faculties, is yet content to live, like a parasite, on the exertions of others, let the first offices of parents be to teach their little ones to help themselves; and, as they learn gradually to supply their own wants without the aid of others, so will they grow self-reliant and self-helpful; learning, early in life, lessons in economy — alike of time and money — in patience, and in persistent labor, which will in after years bear fruit in a strong, earnest, and useful life.

As conducing, therefore, to these much-desired ends, the fingers, the eyes, and all the senses of the little ones, must be studiously trained, from the earliest childhood, with a constant view to the cultivation of mechanical tastes, and to the exercise and development of the various powers and aptitudes by which alone these tastes can fitly express themselves in forms at once useful and beautiful.

It is undoubtedly true that the training of the mechanical faculties, far from standing in the way of purely intellectual education, is a positive aid to it, besides fitting pupils the better to master the great problems of life.

The education of the future, therefore, must help young people to *work*, not to live *without working;* it must, especially, develop all their powers, talents, and faculties; and, above all, it must early instill into the young mind the great

truth that success is only attainable by the harmonious association of the *head* with the *hand* and the *heart*.

As a result of this helpful training, a full and complete humanity will be developed by the beneficent influence exerted upon the ethical nature of the child, which will give him firmness and singleness of purpose, habits of creative diligence, subordination to the common aims of society, and, above all, unfailing cheerfulness — the only atmosphere in which true virtue can thrive.

Were it for no other reason than for having clearly seen this truth, and embodied it practically in his Kindergarten system of education, Frœbel deserves to rank as one of the greatest benefactors of humanity.

What is the Effect of Kindergarten Education?

The Opinions of 21 practical Kindergartners,

communicated to the U. S. Bureau of Education in reply to inquiries.

(From the *Reports of the Commissioner of Education* for 1874 and 1875.)

"Physical development, manual skill, habits of clear thinking, order, precision, and attention." — "Freedom and grace of movement, command of language, and superior preparation for public schools." — "Development of the powers of application, perception, and reasoning."— "Harmonious development; the mind is made active and the body is strengthened." — "Excellent; minds clearer and quicker in acting." — "Mental and physical development, and ability for self-occupation."— "Beneficial to mind and body; all organs and powers are developed harmoniously." — "It promotes a healthy and harmonious growth, a habit of attention, and a clear perception." — "Mental and physical development and quickened observation." — "Excellent progress without overtaxing the pupils." — "Harmonious and natural development of every faculty, and strength, agility, and healthfulness of body and mind." — "The best preparation for the common schools." — "Habits of observation, correctness, and application." — "Habits of attention, concentration, obedience, and progress in studies." — "The child becomes graceful, polite, self-dependent, skillful, thoughtful, constructive, and eager for knowledge." — "It strengthens the body, exercises the senses, and employs the awakening mind." — "Physical development, clearness of ideas, and harmonious growth of the whole nature." — "It promotes a graceful carriage, healthy body, and well-balanced mind." —"Physical, mental, and moral development, and ability to combine knowing with doing." — "Correct habits of thinking are formed, accuracy of eye and manual skill are cultivated, and the muscles are exercised." — "It promotes strength of limb, symmetry of form, grace and agility of movement; it cultivates powers of observation and concentration, use of language, memory and reason." —

Perhaps the strongest endorsement of the Kindergarten system as a **practical means of education** which may be almost everywhere introduced, is found in the fact that in 1873 a Kindergarten was established **in connection with the public schools** of St. Louis, Mo. In five years the number of such Kindergartens has grown to 45 with the prospect of continual increase, and it has been stated that the result of this new method will be a saving of from one to two years schooling to the pupils, consequently also, a saving of money to the public treasury—a matter worthy of the most careful consideration of all.

Inexpensive Public Kindergartens.

(Report made December 18th, 1877, to the Board of Public Schools, concerning the Kindergartens forming part of the Public School system of the City of St. Louis, by the Hon. W. T. HARRIS, City Superintendent of Public Schools.)

In the 41 kindergartens at present in operation, there are 39 directors, 39 paid assistants, and 165 volunteer assistants.

Inasmuch as a year's training in the kindergarten may be regarded as a most excellent preparatory training of a young lady for the duties of life, it is not suprising that we have found it so easy to find a sufficient number of unpaid assistants. It does not seem unreasonable that all who can afford the expense will come to regard it as essential that their daughters shall spend at least a year in the kindergarten as a finishing school. This would render it possible in all our cities to establish kindergartens so cheaply that there would be no question in regard to expense. Hitherto the chief hinderance in the way of the progress of the kindergarten both here and in Europe had been the great expense attending it. The average number of pupils assigned to a teacher in a kindergarten ought not to exceed fifteen or twenty, while in a well-graded primary school the number may exceed 60 or even 80. In our kindergartens the attempt has been made to solve the problem of economy. We have a director and a paid assistant in each, the former receiving a salary of from $400 to $600, and the latter of $100, so that the aggregate expense per annum is only $500 to $700 for each kindergarten—the two paid teachers being assisted by from three to ten unpaid assistants, who sign a written agreement to serve for a year without compensation, for the sole purpose of learning the art.

Inasmuch as the number of children enrolled in our forty-one kindergartens the past quarter is 3,676, with an average of about 90 to each one, it is clear that the expense per pupil is far below the cost of primary instruction in our city.

The cost of primary instruction is about $11.50 per pupil of the entire number enrolled for the year. The cost of the kindergarten on the modified Lancasterian system now used in our schools was for the year before last about $5.76 for each pupil of the 1,041 enrolled; it was $4.05 for each pupil of the 3,333 enrolled last year in thirty kindergartens. I think the average cost will be about the same for this year. Although we have increased our number of paid assistants, the enrollment of pupils will also be much larger.

The material used by the pupils in their occupations, weaving, embroidering, modeling, etc., is nearly or quite paid for by the fee of one dollar a quarter, collected from all except indigent pupils.

In these data we have the key to the financial problem of the kindergarten. Should the Board find itself unable—by reason of expense—to continue the system which has borne such good results thus far, it is clear that an additional fee of one dollar per quarter, making the cost to each pupil a dollar for every five weeks, would make our kindergartens self-sustaining.

NOTE. The Gifts and Occupation Material used in the St. Louis Public Kindergartens are being supplied by E. STEIGER, New York.

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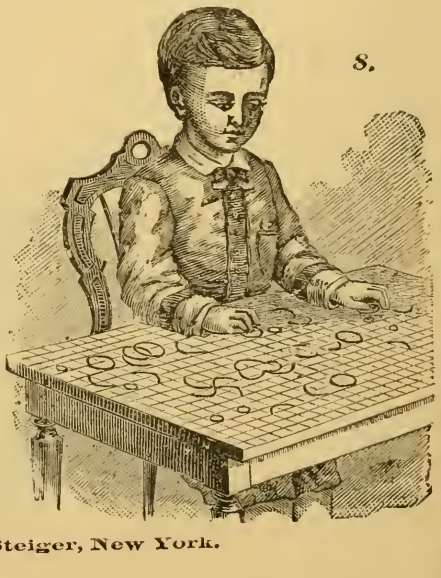

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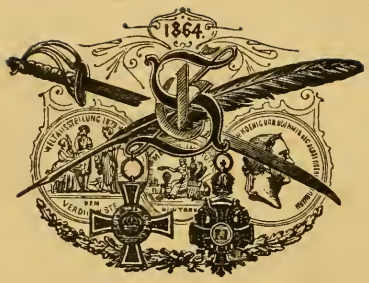

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